CROSS REFERENCE TO RELATED APPLICATION **FACE DETECTION IN DIGITAL IMAGES**
This application is a continuation-in-part ⟶
of application 09/326,561 filed June 7, 1999 **Technical Field of the Invention**
now U.S patent 6,661,907
QeD.

The present invention relates to digital colour images and, in particular, to the detection of faces in colour digital images.

Background Art

Colour digital images are increasingly being stored in multi-media databases, and utilised in various computer applications. In many such applications it is desirable to be able to detect the location of a face in a visual image as one step in a multi-step process. The multi-step process can include content-based image retrieval, personal identification or verification for use with automatic teller machines or security cameras, or automated interaction between humans and computational devices.

Various prior art face detection methods are known including eigenfaces, neural networks, clustering, feature identification and skin colour techniques. Each of these techniques has its strengths and weaknesses, however, one feature which they have in common is that they are computationally intensive and therefore very slow, or they are fast but not sufficiently robust to detect faces.

The eigenface or eigenvector method is particularly suitable for face recognition and there is some tolerance for lighting variation, however it does not cope with different viewpoints of faces and does not handle occlusion of various facial features (such as occurs if a person is wearing sunglasses). Also it is not scale invariant.

The neural network approach utilises training based on a large number of face images and non-face images and has the advantages of being relatively simple to implement, providing some tolerance to the occlusion of facial features and some tolerance to lighting variation. It is also relatively easy to improve the detection rate by re-training the neural network using false detections. However, it is not scale invariant,